საქართველოს ეროვნული უნივერსიტეტი სეუ
GEORGIAN NATIONAL UNIVERSITY SEU

Georgian National University SEU
Bachelor's Educational Program

DATA SCIENCE AND ARTIFICIAL INTELLIGENCE

2026

GENERAL INFORMATION

Program Name: Data Science and Artificial Intelligence

Higher Education Cycle: First Cycle (bachelor's degree)

Qualification Level: Level 6

Awarded Qualification: Bachelor of Computer Science

Field and Classification Code: 0613 Software and Applications Development and Analysis

Teaching Language: English

Program Duration: 3 academic years / 6 semesters

Program Credit Capacity (ECTS): 180 credits / 4500 astronomical hours

Head of Program: Lia Kurtanidze, Associate Professor

Co-head of Program: Vera Jeladze, Professor

PROGRAM DESCRIPTION

The Bachelor’s Program in Data Science and Artificial Intelligence has been developed with consideration of the current challenges in the field and the demands of the local labor market.

The Bachelor's program is structured around the following principle: mandatory and elective courses corresponding to the main field of study, along with free components. Within the main field, students take foundational courses as well as core subject-specific courses. Elective specialization courses focus on developing knowledge and practical skills related to specific topics within the field. The free component includes courses offered within the university’s undergraduate programs that aim to support the development of general and transferable skills. Students are free to choose these courses based on their interests, allowing them to broaden their academic perspective, provided they meet the prerequisites required for each course.

The Bachelor’s Program in Data Science and Artificial Intelligence encompasses not only programming disciplines but also mathematical foundations. In addition to programming skills, graduates in this field are required to have strong algorithmic thinking abilities and a solid background in mathematics. The curriculum is designed so that the majority of mandatory courses — such as Programming, Statistics, Machine Learning, Data Visualization, Big Data Analytics, Algorithms, Neural Networks, and others — aim to build these foundations. As part of the elective offerings, the curriculum provides students with a diverse list of practical courses, allowing them to select courses according to their interests and labor market demands.

PROGRAM GOALS

The goals of the Bachelor's Program in Data Science and Artificial Intelligence at Georgian National University SEU are:

I. To provide students with solid theoretical and practical knowledge in computer science;

II. To equip students with the competencies necessary to solve practical problems in the fields of data science and artificial intelligence;

III. To develop students' ability to apply methods and tools from the fields of computer and data science;

IV. To prepare students to respond to challenges associated with modern technologies and to become competitive specialists capable of employment in both private and public sectors.

PROGRAM LEARNING OUTCOMES

A graduate of the Data Science and Artificial Intelligence Bachelor's Program at Georgian National University SEU will:

I. Knows the basic concepts and theoretical issues of computer science;

II. Describes the tools and theoretical foundations necessary for implementing projects in the fields of Data Science and Artificial Intelligence;

III. Analyzes algorithms, appropriate models, and software tools related to computer science and data science in accordance with the given task.

IV. Analyze problems in computer science and data science using relevant disciplinary approaches;

V. Apply data science and artificial intelligence tools in the development of computer technology-based solutions;

VI. Collect, process, analyze, and present information in accordance with specified requirements;

VII. Prepares presentations and communicate effectively in professional activity process;

VIII. Plans development-oriented activities, both individually and within a team, in accordance with the principles of professional ethics.

MAP OF COMPETENCES

ALIGNMENT OF PROGRAM GOALS WITH LEARNING OUTCOMES

program of learning results / program goals		According to the numbering of learning outcomes							
		I	II	III	IV	V	VI	VII	VIII
I	To provide students with solid theoretical and practical knowledge in computer science;	√	√	√					
II	To equip students with the competencies necessary to solve practical problems in the fields of data science and artificial intelligence;		√	√	√	√	√		
III	ITo develop students' ability to apply methods and tools from the fiel computer and data science;		√	√	√	√	√	√	√
IV	To prepare students to respond to challenges associated with modern technologies and to become competitive specialists capable of employment in both private and public sectors.	√	√					√	√

THE COMPLIANCE OF STUDY COURSES WITH THE PROGRAM LEARNING OUTCOMES

A map of the relevance of the curriculum to the learning outcomes of the program (1- Introduction, 2- Deepening the knowledge, 3 - Mastering)

Study Courses		Learning Outcomes							
		I	II	III	IV	V	VI	VII	VIII
I.	Mathematics for Technology	1		2			1	1	1
II.	Business Management Principles for IT Specialists							1	2
III.	Computer Skills, Ethics, and Professionalism	1					1	1	1
IV.	Discrete Mathematics	2	1	1	2				
V.	Fundamentals of Programming on Python			1		1	1		
VI.	Fundamentals of Computer Organization and Architecture	2	2			1			
VII.	Innovative and Technological Entrepreneurship						1	1	2
VIII.	Object-Oriented programming based on Python	1	1	1	2	2	2		
IX.	Fundamentals of Database	1	1		2	1	2		
X.	Operating Systems	1	1	2		2	2		
XI.	Linear Algebra	2	2			1	2		
XII.	Database Management System Oracle	1		1	2	2	3		
XIII.	Web technologies (client side)		1	2		3	3		
XIV.	Fundamentals of Data Science and Big Data	1	1	1	2	3	3		
XV.	Introduction to Computer Networks	1			2	2			
XVI.	Probability Theory and Statistics	2	1	2	2		2		
XVII.	Fundamentals of Artificial Intelligence	3	2	3	2	3	2		
XVIII.	Data structures and Algorithms	2	1	3		3	3		
XIX.	Data Mining and Cleaning Technologies			1	1	3	3	1	
XX.	Web technologies (server side)		2	1		3	1	1	
XXI.	Software Systems for Data Processing			1	2	2	2	2	
XXII.	Artificial neural networks	2	1	1		3	1		

XXIII.	Cybersecurity	1	2		3				
XXIV.	Machine Learning	1		2	1	3	3		
XXV.	Natural Language Processing (NLP)	1	1	2	2	3			
XXVI.	Cloud Computing			3	1	2	2		
XVII.	R-programming			2		3	2		
XVIII.	Data Analytics and Visualization		1	1	2	2	3		
XXIX.	Practice		2	1		1	2	2	3

Program Admission Requirements

Enrollment Conditions

A person with a full general education certificate or equivalent document issued in Georgia, who has obtained the right to enroll in SEU and has been registered on the basis of the results of the Unified National Examinations, shall have the right to study Bachelor's Program of Data Science and Artificial Intelligence.

Obtaining the Student Status Without Passing the Unified National Examinations

Obtaining the status of a student without passing the Unified National Examinations shall be allowed in accordance with the rules and within the timeframe established by the Ministry of Education and Science of Georgia:

A) For foreign citizens and stateless persons who have received a full general or equivalent education in a foreign country, or foreign citizens and stateless persons (except for those who are citizens of Georgia at the same time), who received a full general or equivalent education in Georgia according to foreign or international programs recognized by Georgia;

B) For citizens of Georgia who have received full general or equivalent education in a foreign country and have studied in a foreign country for the last 2 years of full general education;

C) For foreign citizens (except for students participating in a joint Higher Education program and students participating in an exchange education program) who are studying/have studied and received credits / qualifications in a Higher Education Institution recognized in a foreign country in accordance with the legislation of that country.

D) For citizens of Georgia (except for students participating in a joint Higher Education program and students participating in an exchange education program) who live/lived, study/studied and have received credits/qualification in a foreign country at a Higher Educational Institution recognized in accordance with the legislation of this country for the period determined by the Ministry of Education and Science of Georgia.

E) The Higher Educational Institution is obliged to confirm that the persons, wishing to obtain the right to study, possess the language of instruction of the chosen educational program at least B1 level.

Enrollment by Mobility

Admission of students from other higher education institutions / programs to the Bachelor's program through mobility is carried out in accordance with the rules established by the order N 10 / N of the Minister of Education and Science of February 4, 2010.

A person whose enrollment in a higher education institution has been carried out in accordance with the rules established by law and is a student of the institution wishing to register for mobility on the electronic portal of the Education Management Information System has the right to mobility.

The right to mobility is also granted to a person whose student status has been suspended at the time of registration on the electronic portal or to a person whose status has been terminated within 12 months of the termination of the status.

Enrollment in the Bachelor's educational program or enrollment by transfer from a recognized higher education institution abroad is carried out on the basis of the order of the Minister of Education and Science of Georgia. Based on the decision / consent of the Ministry of Education and Science of Georgia.

ORGANIZING TEACHING

The duration of the Bachelor's Program in Data Science and Artificial Intelligence is 3 academic years (6 semesters) and implies the accumulation of 180 ECTS, which equals to 4500 hours. Each credit (ECTS) equals to the learning activity of a student (student workload) of 25 hours and includes both – contact and independent hours.

The distribution of credits among the different study components should be based on a realistic assessment of the study load of a student with average academic achievements that are required to achieve the learning outcomes and goals set for each component.

When calculating the credit, the time determined for the additional exam (preparation, passing, evaluation) as well as the consultation time with the person implementing the component of the educational programme should not be taken into account.

The full workload of an academic year includes 60 (ECTS). During the academic (spring and autumn) semester the student must cover on average 30 credits.

Taking into account the features of the higher education programme and/or the student's individual curriculum, it is allowed for the student's study load to exceed 60 credits or be less than 60 credits during one academic year. It is not allowed for a student's study load to exceed 75 (ECTS) credits in one academic year.

An academic week is a period of time over which the study load of a student with average academic achievement is distributed and includes a combination of activities to be performed during both contact and independent hours.

A semester is a period of time that includes a combination of academic weeks, a period of conducting an exam/additional exam and evaluation of student’s learning outcomes.

The program is regarded as completed, when the student accumulates at least 180 ECTS, which implies the fulfilment of the basic, elective and free components of the field determined under the program.

TEACHING-LEARNING METHODS

Lecture - is a creative process where a lecturer and a student take part simultaneously. The main aim of the lecture is to understand the idea of the subject regulations to be learnt, which means a creative and active perception of presented material. In addition, an attention should be paid to the main provisions of transferable material, definitions, indications, assumptions. Critical analysis of the main issues, facts and ideas are necessary. A lecture should provide a scientific and logically consistent knowledge of main subject regulations to be learnt without excessive details overloading. Therefore, it must be logically completed. In addition, facts, examples, charts, drawings, tests and other visual aspects should be aimed at the explanation of the lecture's idea. The lecture should provide an accurate analysis of science dialectical process and should be based on free-thinking ability of students in particular environment, understanding of the basic scientific problems and the orientation of understanding. Lecture uses rbal or oral method and involves the communication of the lecture material to students verbally, method used during this process include: questions and answers, interactive work, the theoretical explanations of the provisions based on practical situations.

Collaborative - teaching method involves dividing students into groups and giving them learning assignments. The members of the group work on the issue individually and at the same time share it with the other members of the group. Due to the set task, it is possible to redistribute functions among the members during the group work process. This strategy ensures maximum involvement of all students in the learning process.

Independent work- material heard in the lecture is formed as a whole system of knowledge by the independent work of the student. The student should be interested in the book and other sources of information and want to study the issues independently, which is a way to stimulate independent thinking, analysis and drawing conclusions.

Verbal, or oral, method includes lecture, narration, conversation, and etc. In this process, the lecturer conveys the teaching material through words, while the students actively perceive and master it by listening, remembering and understanding.

Method of working on the book involves introduction, processing and analysis of independently given reading material.

The method of written work- involves the following types of activities: making records, compiling material, composing thesis, performing an abstract, or essay, etc.

Practical methods combine all the forms of teaching that develop the student's practical skills, here the student independently performs this or that activity on the basis of acquired knowledge.

Discussion / debate is one of the most common methods of interactive teaching. The discussion process drastically increases the quality and activity of student engagement. The discussion can turn into an argument. This process is not limited to questions asked by the lecturer. This method develops the student's ability to argue and justify his or her own opinion.

Problem-Based Learning (PBL) - a learning method that uses the problem in the early stages of the process of acquiring and integrating new knowledge.

Cooperative learning - is a teaching strategy in which each member of the group is required not only to study but also to help his or her teammate learn the course better. Each group member works on the problem until all of them have mastered the issue.

Case study -an active problem-situation analysis method, based on teaching by solving specific tasks - situations (so-called case solving). This method of teaching is based on the discussion of specific practical examples (cases). The case is a kind of tool that allows the application of the acquired theoretical knowledge to solve practical tasks. By combining theory and practice, the method effectively develops the ability to make

reasoned decisions in a limited amount of time. Students develop analytical thinking, teamwork, listening and understanding alternative thinking, the ability to make generalized decisions based on alternatives, plan actions, and predict their outcomes.

Brain storming- is a method student can use to generate ideas for solving the problem. In the process of brainstorming students must suspend any concerns about staying organized. The goal is to pour their thoughts without worrying about whether they make sense or how they fit together. It is effective method within the group and contains following stages:

- Creative definition of problem
- Taking notes of ideas without criticism
- Definition of estimation criterion
- Evaluation of ideas by preliminarily defined criterion
- Selection of best matching ideas by exclusion
- Manifestation of idea with the highest estimation for solving the problem

Role-playing and situational games Scenario-based role-playing games which allow students to look at the issue from different positions and help them form an alternative point of view. Like the discussion, role-playing games develop the student's ability to express and defend his or her position independently.

Demonstration method- involves visual representation of information. It is quite effective in terms of achieving results. In many cases, it is best to provide the material to students in both audio and visual form. Demonstration of the study material can be done by both the teacher and the student. This method helps us to visualize the different levels of perception of the learning material, to specify what students will have to do independently; At the same time, this strategy visually illustrates the essence of the issue / problem. Demonstrations may look simply,

such as solving a mathematical problem, visualizing a step on its board, or taking on a complex look, such as conducting a multi-level science experiment.

Inductive Method- defines a form of transferring knowledge, when the course of thought in the process of learning is directed from facts to generalization, that is, when conveying material, the process proceeds from specific to general.

Deductive Method- the process of reasoning from one or more statements (premises) to reach a logically certain conclusion. It works from the more general to the more specific.

Analysis- through this method, lecturers and students discuss specific cases together. Students thoroughly learn the previously unknown sides of the issue. The method of analysis enables us to break up the whole part of the study the material into constituent parts, which simplifies the understanding of the specific issues of the problem.

The synthesis method -involves composing one whole by grouping individual issues. This method helps to develop the problem as the ability to see the whole.

The explanatory method is based on reasoning around a given issue. In presenting the material, the lecturer gives a specific example, which is discussed in detail in the given topic.

Action-oriented teaching - requires the active involvement of the lecturer and the student in the teaching process, where the practical interpretation of the theoretical material becomes particularly important.

Laboratory learning- is more visible method and allows you to perceive an event or process. In the lab, the student learns to conduct an experiment. During the laboratory study, the student should be able to control the devices, adjust them and determine the mode of operation. Habits developed in learning laboratories provide an understanding of the theoretical material heard in lectures.

The development and presentation of the project -is a combination of educational and cognitive tools, which allows to solve the problem in the conditions of the necessary presentation of the student's independent actions and the obtained results. Teaching in this way raises students' motivation and responsibility. Work on the project includes stages of planning, research, practical activity and presentation of results according to the chosen issue. The project will be considered feasible if its results are visible, convincing and concrete. It can be performed individually, in pairs or in groups; Also, within one subject or several subjects (integration of subjects). Upon completion, the project will be presented to a wide audience.

E-learning - This method includes three types of teaching:

- Attendance when the teaching process takes place within the contact hours of the lecturer and the students, and the teaching material is delivered through an electronic course.
- Hybrid (attendance / distance), the main part of the learning course is done remotely, and a small part is done within the contact hours.
- Completely distance learning involves conducting the learning process without the physical presence of the lecturer. The learning course is held electronically from beginning to end.

EVALUATION SYSTEM

The system of evaluation of learning outcomes and competencies is based on the system recognized by the legislation and corresponds to the evaluation and credit granting standards approved by the OrderN3 of the Minister of Education and Science of Georgia dated January 5, 2007. Student assessment system includes:

a) Five types of positive evaluation:

a.a) (A) Excellent – 91-100 points;

a.b) (B) Very good – 81-90 points;

a.c) (C) Good – 71-80 points;

a.d) (D) Satisfactory – 61-70 points

a.e) (E) Sufficient – 51-60 points;

b) Two types of negative evaluation:

b.a) (FX) did not pass - 41-50 points of maximum evaluation, which means that the student needs more work to pass the examination and is given the right to retake (one time) an exam via independent work;

b.b) (F) Failed – 40 points or less, which means that the work done by the student is not sufficient and he/she has to retake the course.

In case student gets FX, he/she can take the additional exam in the same semester at least 5 days after the announcement of the final exam results.

The number of points obtained in the final assessment is not added to the grade received by the student at the additional exam. The grade obtained at the additional exam is the final grade and is reflected in the final grade of the study component of the educational program.

Considering the additional exam evaluation if the points accumulated by student in the educational program component is 0-50 points, student is evaluated with F-0.

A prerequisite for a student's admission to the final exam is to overcome the competence threshold of the Midterm Evaluation (No less than 11 points within Midterm Evaluation).

Competency threshold for the Final Exam is 30%, no less than 12 points.

Prerequisite for granting the credit is accumulating no less than 51 from 100 points and to overcome the minimum competency threshold of Midterm Evaluation and Final Exam.

EVALUATION COMPONENTS

Student assessment in each learning component of the program includes two forms of assessment - midterm assessment and final assessment.

Each form of evaluation includes an evaluation component/components, which includes the evaluation method/methods, and the evaluation method/methods are measured by the evaluation criteria, which are spelled out in the syllabi of the respective program and are available to all students at the beginning of the semester in the electronic system of the educational process - emis.seu.edu.ge.

In each educational component of the educational program, 60 points are assigned to the midterm evaluation, and 40 points to the final evaluation, from the total evaluation score (100 points) to determine the final evaluation of the student. The midterm and final assessment have a minimum competency threshold, which is determined by the syllabus of the respective component. Exceptions are established taking into account the specifics of the specific program/educational component, in accordance with the requirements established by the current legislation of Georgia.

PROGRAM INTERNATIONALIZATION

1. Polytechnic Institute of Bragança
2. Yeditepe University
3. University of Economics and Human Sciences in Warsaw
4. Tor Vergata University of Rome
5. Klaipeda State University
6. UC Berkeley
7. Riga Business School
8. Transport and Telecommunications Institute, Latvia

PRACTICAL RESOURCE

The program includes a mandatory component of training practice. The university has signed memorandums of cooperation/agreements with practice facilities. Practice is an important part of the learning process and is a planned and purposeful activity of the student, strengthening the theoretical knowledge received in the academic environment and acquiring practical skills. The goal of practice is to equip students with practical skills and prepare them for future independent professional activities.

In addition to the planned practical component, the university cooperates with dozens of economic agents, through the organization or partnership of which internships, seasonal schools, master classes, trainings and others are periodically announced. In order to ensure the implementation of professional practice, the university has signed agreements/memorandums with the following partner organizations.

PARTNER ORGANIZATIONS

1. Georgian National University SEU LLC (Information Technology Department)
2. IT Academy STEP LLC
3. INI.GE LLC
4. Hosti.ge LLC
5. Global IT LLC
6. Avia Network LLC
7. Microfinance Organization LendUp LLC
8. allmarket.ge LLC
9. Easy Credit LLC
10. JSC Wissol Petroleum Georgia
11. JSC Bank of Georgia
12. JSC TBC Bank
13. JSC FINCA Bank Georgia
14. IT Synergy LLC
15. ITCraft LLC
16. Provider LLC
17. Tech Engineering Group LLC
18. Non-entrepreneurial (non-commercial) Legal Entity – Georgian Artificial Intelligence Association
19. Discover Georgia LLC
20. Solvity LLC
21. Softegen LLC
22. LiveSupport LLC
23. Explorium LLC
24. ITechnics LLC
25. CityPay LLC
26. Orient Logic LLC
27. Liberty Bank
28. Terabank

PROGRAM EMPLOYMENT FIELD

Graduates of the Bachelor's Program in Data Science and Artificial Intelligence can find employment in both public and private sectors. They will be qualified to work as software developers, data analysts, artificial intelligence engineers, machine learning engineers, data scientists, IT specialists, network administrators, and more. They will have the opportunity to be employed in any organization where they can practically apply their primary professional skills.

OPPORTUNITIES TO CONTINUE STUDYING

A graduate of the Bachelor's program in Data Science and Artificial Intelligence is can continue studies at the second level of higher education (Master's degree), in Georgia or abroad, in accordance with the rules established by the law, by complying with the prerequisites for admission to the Master's educational program.

PROGRAM RESOURCES

MATERIAL RESOURCES

Bachelor's Program in Data Science and Artificial Intelligence is implemented in the campus equipped with modern infrastructure, it is provided with library, material and technical resources, which ensure the achievement of the program goals and learning outcomes in material and quality terms. All rooms are equipped with the devices necessary for the implementation of learning process. Students are informed about the opportunity to use existing resources and about the rules of use.

Computer classes are available at the University for practical and laboratory works with relevant equipment. The computer capabilities and their number totally make it possible to implement the program perfectly in terms of software and hardware.

All necessary literature and other materials (including those existing on the electronic carriers) determined by the course syllabuses of the program are available in the library, which ensures the achievement of the learning outcomes of the educational program.

The University has executed an agreement with the NNLE Georgian Library Association on the service of international electronic library bases. The most recent scientific periodicals, international electronic library bases are available for students, that enables the, to familiarize themselves with the most recent scientific data of the respective field in order to achieve the learning outcomes of the program.

At the university, computer labs equipped with the necessary hardware are designated for practical and laboratory work. The specifications and quantity of computers fully support the effective implementation of the program, both in terms of software and hardware resources.

Information Technology Laboratory (IT Lab) – A specialized educational lab designed for hands-on learning in computer architecture, networking, and system administration. The lab is equipped with computer hardware components, including processors, motherboards, RAM, hard drives, and network devices (routers, switches), along with other technical elements. In this lab, students acquire practical skills in assembling computers, installing operating systems, configuring network infrastructure, and implementing security mechanisms.

Artificial Intelligence Laboratory (AI Lab) – A modern and innovative educational-research lab equipped with next-generation computers. The lab serves both educational/practical and research purposes. It is designed to foster the development of artificial intelligence technologies, including machine learning, natural language processing, robotics, and more. It also facilitates the implementation of various applied projects, such as developing practical applications for industries like healthcare, business analytics, finance, commerce, education, and so on.

Blockchain Laboratory – Equipped with state-of-the-art computers, this lab offers practical courses aimed at supporting technological advancement and enabling students to explore and implement modern blockchain solutions.

Tech and Entrepreneurship Laboratory – To foster the development of practical skills, the university also hosts a Tech and Entrepreneurship Lab. This lab provides students with the opportunity to engage in real business projects and acquire specific skills needed for various projects through individual mentorship. Within the context of elective courses, the lab connects students with shared ideas and gives them the chance to turn their business concepts into reality. Additionally, workshops and activities are organized by industry specialists to develop specific skillsets. The lab is actively involved in integrating practical elements into specific courses and coordinates the participation of practitioners and companies in the educational process.

FUNDING OF THE PROGRAM

The financial support of the Bachelor's program in Data Science and Artificial Intelligence is provided by the program budget. The amount allocated from the budget is directed to the constant updating of the material and technical resources and literature provided by the program, the organization of scientific conferences, the salary expenses of the academic/guest staff and the publishing and printing of their works. The budget also provides for the expenses of academic/guest and administrative personnel's scientific business trips, funding of students in exchange programs, international trainings and conferences.

MONITORING OF THE PROGRAM QUALITY

The monitoring and the periodical assessment of the Bachelor's Program in Data Science and Artificial Intelligence shall be performed with the participation of academic/invited, administrative/assistant personnel, students, alumni, employers and other interested persons, through systematic collection, processing and analysis of information. Based on the assessment outcomes, when necessary, the program will be modified/developed.

The Quality Enhancement Department performs regular analysis and other activities intended for the quality enhancement, which consist of the following surveys:

- Lecturer and Study Course Evaluation by students (once per semester);
- Educational Program Evaluation by students (have they achieved the learning outcomes determined by the program) (in the last year of the study);
- University's Institutional Evaluation by students (once a year);
- Alumni Research (six months after the end of the program);
- Students' Satisfaction with Practice Course
- Employers' Survey (once a year);
- Self-evaluation of the study course (by the lecturer, once a semester);
- Self-evaluation of the program (by the head/co-head of the program, once a year).
- Analysis of Students' Academic Performance

Each survey is analyzed and the tendencies are determined across the University. Also, at the level of structural units, faculties and educational programs. The surveys and studies enable the conducting of the comparative analysis between the faculties and the educational programs. The

comparative analysis is performed by the Quality Enhancement Department and the results are provided to all interested persons. The Quality Enhancement Department plans the organization of trainings with the personnel and students involved in the quality assurance processes in order to further reinforce the processes for their active participation in these processes.

Survey results are visualized using the automated system Microsoft Power BI. It is a business analytics and data visualization tool that, by connecting to databases, allows for the transformation of raw data, data modeling, and visually interactive analysis of survey results. Power BI supports Excel, SQL databases, and various cloud services. Currently, the university is analyzing student academic performance, student internship satisfaction survey, freshman survey, and educational program learning outcome evaluation report in a fully automated mode.

DATA SCIENCE AND ARTIFICIAL INTELLIGENCE

PROGRAM CURRICULUM

	Course Name	ECTS	Total hours	Admission prerequisite	Student's study load					I	II	III	IV	V	VI
					Lecture	Practical/group work	Midterm and final exams	Total contact	Independent work						
Basic courses															
N	**Mandatory courses for the specialty**	**141**	**Number of mandatory credits to be taken in the relevant semester**							**I**	**II**	**III**	**IV**	**V**	**VI**
										24	**24**	**24**	**24**	**25**	**25**
1.	Mathematics for Technology	6	150	N/A	26	24	5	55	95	**6**					
2.	Fundamentals of Computer Organization and Architecture	4	100	N/A	14	12	5	31	69	**4**					
3.	Computer Skills, Ethics, and Professionalism	4	100	N/A	14	12	5	31	69	**4**					
4.	Discrete Mathematics	5	125	N/A	14	12	5	31	94	**5**					
5.	Fundamentals of Programming on Python	5	125	N/A	15	24	5	44	81	**5**					
6.	Business Management Principles for IT Specialists	5	125	N/A	14	12	5	31	94		**5**				
7.	Operating Systems	5	125	Fundamentals of computer Organization	14	12	5	31	94		**5**				

				and Architecture											
8.	Object-Oriented programming based on Python	4	100	Fundamentals of Programming on Python	14	12	5	31	69		**4**				
9.	Fundamentals of Database	5	125	Computer Skills, Ethics, and Professionalism	14	12	5	31	94		**5**				
10.	Linear Algebra	5	125	Mathematics for Technology	13	24	3	40	85		**5**				
11.	Innovative and Technological Entrepreneurship	5	125	N/A	11	14	5	30	95			**5**			
12.	Introduction to Computer Networks	4	100	Operating Systems	14	12	5	31	69			**4**			
13.	Database Management System Oracle	5	125	Fundamentals of Database	15	24	3	42	83			**5**			
14.	Web technologies (client side)	5	125	Fundamentals of Programming on Python	13	12	5	30	95			**5**			
15.	Probability Theory and Statistics	5	125	Mathematics for Technology	15	24	5	44	81			**5**			
16.	Fundamentals of Data Science and Big Data	4	100	Fundamentals of Database	14	12	5	31	69				**4**		
17.	Web technologies (server side)	5	125	Web technologies (client side) Fundamentals of Database	14	12	5	31	94				**5**		

18.	Data Structures and Algorithms	6	150	Fundamentals of Programming on Python	26	24	5	55	95				**6**		
19.	Data Mining and Cleaning Technologies	4	100	Object-oriented programming based on Python; Web technologies (client side); Linear algebra	14	12	5	31	69				**4**		
20.	Fundamentals of Artificial Intelligence	5	125	Discrete Mathematics, Mathematics for Technology	13	24	5	42	83				**5**		
21.	Artificial neural networks	6	150	Mathematics for Technology; Fundamentals of Artificial Intelligence; Linear Algebra	26	24	5	55	95					**6**	
22.	Cybersecurity	4	100	Introduction to Computer Networks	14	12	5	31	69					**4**	
23.	Machine Learning	5	125	Fundamentals of Programming on Python	14	22	5	41	84					**5**	
24.	Software Engineering	5	125	Fundamentals of Programming on Python	13	24	5	42	83					**5**	

25.	Data Analytics and Visualization	5	125	English for information technology	13	24	5	42	83					**5**	
26.	Natural Language Processing (NLP)	5	125	English for information technology, Artificial Neural Networks	13	24	5	42	83						**5**
27.	Cloud Computing	5	125	Cybersecurity	13	12	5	30	95						**5**
28.	R-programming	5	125	English for information technology, Fundamentals of Programming on Python	13	12	5	30	95						**5**
29.	Practice in Data Science and Artificial Intelligence	5	125	Compulsory courses for semesters I-V	40		3	43	82						**5**
N	**Elective courses in the specialty**	**10**	**Number of elective credits to be taken in the respective semester**							**I**	**II**	**III**	**IV**	**V**	**VI**
														5	**5**
1.	Physics for Information Technology	5	125	Mathematics for Technology	26	15	6	47	78						
2.	Computer Graphics Instruments 1	5	125	N/A	27	12	5	44	81						
3.	Computer Graphics Instruments 2	5	125	Computer Graphics Tools 1	27	12	5	44	81						
4.	Deep Learning	5	125	English for information technology,	26	12	5	43	82						

				Artificial Neural Networks,											
5.	Data Processing Software Systems	5	125	Fundamentals of Database, Probability Theory and Statistics	13	12	5	30	95						
6.	C++ Programming	5	125	Fundamentals of Programming on Python	15	24	5	44	81						
7.	Programming on the JVM platform	5	125	Fundamentals of Programming on Python, English for Information Technology	14	12	5	31	94						
8.	Computer modeling of physical processes using MATLAB	5	125	C++ Programming	13	24	6	43	82						
9.	Computer Game Programming	5	125	Web technologies (client side)	13	24	5	42	83						
10.	Mobile Application Development	5	125	Programming on the JVM Platform	14	24	5	43	82						
11.	Blockchain and Studying of the Possible Options of Its Use	5	125	N/A	13	12	5	30	95						
12.	Building Web applications	5	125	English for Information Technology,	13	12	5	30	95						

				Web technologies (server side)												
13.	Logic and Calculations	5	125	English for Information Technology Discrete Mathematics	13	12	5	30	95							
14.	Visual Programming	5	125	Fundamentals of Database, Programming on the JVM platform, English for Information Technology	13	12	5	30	95							
15.	Programming on the Arduino platform	5	125	N/A	9	17	5	30	95							
16.	Compilers	5	125	Data Structures and Algorithms, English for Information Technology	13	24	5	42	83							
N	**University compulsory courses**	**6**	**Number of mandatory credits to be taken in the relevant semester**							**I**	**II**	**III**	**IV**	**V**	**VI**	
1.	Academic writing	3	75	N/A	13	12	5	30	45	3						
2.	Practical course of Georgian language	3	75	N/A	13	12	5	30	45	3						
N	**Mandatory/elective courses**	**18**	**The student can choose the foreign language of his choice (English, German, French, Russian)**							**I**	**II**	**III**	**IV**	**V**	**VI**	

1.	English language B2.1	6	150	N/A		39	7	46	104		**6**				
2.	English language B2.2	6	150	English language B2.1		39	7	46	104			**6**			
3.	English for Information Technology	6	150	English language B2.2		39	7	46	104				**6**		
N	**University elective courses**	**5**	**Number of free credits to be taken in the relevant semester**							**I**	**II**	**III**	**IV**	**V**	**VI**
	Free training courses	**Students can choose their preferred courses of study in interesting fields from the bachelor's programs available at the university, subject to the relevant prerequisites for studying the course.**													**5**
	Total:	**180**								**30**	**30**	**30**	**30**	**30**	**30**

HUMAN RESOURCES

N	Study Course	Course Implementer
1.	Mathematics for Technology	Marika Khachidze
		Tea Shavadze
2.	Fundamentals of Computer Organization and Architecture	Besik Kekelia
		Davit Khipshidze
3.	Computer Skills, Ethics, and Professionalism	Lia Kurtanidze
4.	Discrete Mathematics	Tea Shavadze
5.	Fundamentals of Programming on Python	Giorgi Kokhreidze
		Davit Datuashvili
		Ia Aptsiauri
6.	Business Management Principles for IT Specialists	Teona Maisuradze
7.	Operating Systems	Davit Khipshidze
8.	Object-Oriented programming based on Python	Ia Aptsiauri
		Daviti Datuashvili
9.	Fundamentals of Database	Aleksandre Chakhvadze
		Vaxtang Rodonaia
10.	Innovative and Technological Entrepreneurship	Zurab Pertaia
11.	Introduction to Computer Networks	Levani Julakidze
12.	Linear Algebra	Shalva Beriashvili
		Marika Khachidze

13.	Database Management System Oracle	Aleksandre Chakhvadze
		Davit Gulua
14.	Web technologies (client side)	Besiki Tabatadze
15.	Fundamentals of Data Science and Big Data	Avtandil Bichnigauri
16.	Data processing with Spreadsheets	Gela Pataraia
17.	Probability Theory and Statistics	Shalva Beriashvili
		Marika Khachidze
18.	Fundamentals of Artificial Intelligence	Tea Todua
		Mariam Gamsaxurdia
19.	Data structures and algorithms	Khatuna Elbakidze
		Giorgi Kokhreidze
		Vera Jeladze
20.	Data Mining and Cleaning Technologies	Tornike Skhirtladze
		Avtandil Bichnigauri
21.	Web technologies (server side)	Besiki Tabatadze
22.	Software Systems for Data Processing	Tornike Skhirtladze
23.	Artificial neural networks	Daviti Datuashvili
24.	Applied Statistics	Shalva Beriashvili
25.	Cybersecurity	Avtandil Bichnigauri
		Giorgi Pirveli
26.	Data Science Libraries based on Python	Daviti Datuashvili

		Ia Aptsiauri
27.	**Machine Learning**	Daviti Datuashvili
28.	**Natural Language Processing (NLP)**	Daviti Datuashvili
29.	**Cloud Computing**	Davit Gulua
30.	**R-programming**	Aleksandre Chakhvadze
		Tornike Skhirtladze
31.	**Data Analytics and Visualization**	Tornike Skhirtladze
		Avtandil Bichnigauri
32.	**Deep Learning**	Daviti Datuashvili
33.	**Physics for Information Technology**	Vera Jeladze
34.	**Computer Graphics Instruments 1**	Gela Pataraia
35.	**Computer Graphics Instruments 2**	Gela Pataraia
36.	**C++ Programming**	Vera Jeladze
		Besiki Tabatadze
37.	**Programming on the JVM platform**	Besiki Tabatadze
38.	**Computer modeling of physical processes using MATLAB**	Vera Jeladze
		Lia Kurtanidze
39.	**Computer Game Programming**	Gela Pataraia
40.	**Mobile Application Development**	Giorgi kokhreidze
41.	**Blockchain and Studying of the Possible Options of Its Use**	Erekle Zarandia
		Davit Khipshidze

42.	**Building Web applications**	Besiki Tabatadze
		Tea Todua
43.	**Logic and Calculations**	Lia Kurtanidze
		Mariam Gamsaxurdia
44.	**Visual Programming**	Besiki Tabatadze
45.	**Software Engineering**	Khatuna Elbakidze
		Giorgi kokhreidze
46.	**Programming on the Arduino platform**	Tea Todua
47.	**Compilers**	Besiki Tabatadze
48.	**Academic writing**	Ketevan Nijaradze
49.	**English language B2.1**	Nino Chikovani
		Ketevan Tabutsadze
		Maia Tsurtsumia
50.	**English language B2.2**	Nino Chikovani
		Ketevan Tabutsadze
		Maia Tsurtsumia
51.	**English for Information Technology**	Nino Chikovani
		Ketevan Tabutsadze
		Maia Tsurtsumia

ACADEMIC/ INVITED STAFF

N	Name and Surname	Status	Affiliation
1.	Besiki Tabatadze	Professor	
2.	Davit Gulua	Professor	
3.	Mamuka Jorbenadze	Professor	
4.	Tea Todua	Professor	
5.	Teona Maisuradze	Professor	**Affiliated**
6.	Vera Jeladze	Professor	**Affiliated**
7.	Aleksandre Chakhvadze	Associate Professor	
8.	Avtandil Bichnigauri	Associate Professor	
9.	Daviti Datuashvili	Associate Professor	
10.	Erekle Zarandia	Associate Professor	**Affiliated**
11.	Ia Aptsiauri	Associate Professor	
12.	Ketevan Nijaradze	Associate Professor	**Affiliated**
13.	Khatia Koberidze	Associate Professor	
14.	Khatuna Elbakidze	Associate Professor	
15.	Levani Julakidze	Associate Professor	
16.	Lia Kurtanidze	Associate Professor	**Affiliated**
17.	Maria Kldiashvili	Associate Professor	**Affiliated**
18.	Tea Shavadze	Associate Professor	
19.	Tornike Skhirtladze	Associate Professor	

20.	Vaxtang Rodonaia	Associate Professor	
21.	Zurab Pertaia	Associate Professor	**Affiliated**
22.	Mariam Gamsaxurdia	Assistant Professor	
23.	Besik Kekelia	Assistant Professor	
24.	Davit Khipshidze	Assistant Professor	
25.	Gela Pataraia	Assistant Professor	
26.	Giorgi kokhreidze	Assistant Professor	
27.	Giorgi Pirveli	Assistant Professor	
28.	Marika Khachidze	Assistant Professor	
29.	Ketevan Tabutsadze	Invited lecturer	
30.	Maia Tsurtsumia	Invited lecturer	
31.	Nino Chikovani	Invited lecturer	
32.	Shalva Beriashvili	Invited lecturer	